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Abstract

THIN WALLED STAINLESS STEEL AS FUEL CLADDING MATERIAL IN WATER-COOLED POWER REACTORS.

by

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ABSTRACT

The relatively high neutron absorption cross section of stainless steel indicates that an appreciably improved economy can be achieved through reduction of the wall thickness. Reducing the wall thickness means increased stresses and the tube will eventually collaps on to the fuel which will carry the outer pressure. Results from investigations of the mode of collaps as function of tube-diameter, wallthickness and gap are reported. The fission gas pressure may in certain cases become large enough to deform the canning. Results from experiments in which calculated and observed yield- and bursting pressures have been correlated are given.

The general corrosion rate of austenitic stainless steel is considered very satisfactory in water. Pitting corrosion or other forms of non-uniform corrosion attack is more dangerous as pits may very easily penetrate the thin wall. Observations from some experiments into this matter are given. Welding of thin-walled tubes requires careful plug design and welding technique. Examples of plug-designs, welding cycles and equipment are given. The assembly of long thin-walled fuel stringers into clusters can be done by brazing. Equipment and procedures are described. Assembly can be done by using wire spacers and some experiences with such types are reported.